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ABSTRACT

A study investigated the effect of cultural background on reading comprehension, specifically examining content knowledge (schemata) and overall familiarity with the setting. It tested the hypothesis that when a setting is familiar to readers, the text will be most readable, and will yield the shortest time to read, the best comprehension, and the greatest identification with the text. Subjects were two groups of full-time students enrolled in a large Midwestern university: a native English-speaking group (18 students), and a native Japanese group (18 students). Subjects read texts from the two cultures and from a third, presumably neutral, culture. Each of the texts was systematically modified to create three versions, one for each of the three cultural settings. Results indicated that cultural setting affected the American students to a much greater degree than it did the Japanese students. Japanese students were less affected by shifts in either the cultural basis of the narratives they read or the surface clues as to cultural setting. The neutral setting with phonologically simple names clearly affected comprehension. Overall, results of the analyses support, with minor modification, the primacy of cultural effects on comprehension. The minor modification seems to be that when students spend considerable time in another culture, they seem to develop greater flexibility in adapting to cultural variation. (Four tables of data are included. Samples of texts used, text transformations, and excerpts from the reading materials are attached.) (MG)

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Effects of Cultural Familiarity on Reading Comprehension

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Effects of Cultural Familiarity on Reading Comprehension

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Recent reading research provides substantial evidence for the effect of cultural background on comprehension. For example, Steffensen, Anderson, and Joag-dev (1979) found that two groups of subjects, Americans and Indians respectively, better comprehended a text dealing with a wedding ceremony of their native culture (American/Indian) than one from an unfamiliar culture: content schemata on the cultural background of the text affected on the comprehensibilities of texts significantly.

Whereas Steffensen et al.'s experiment is concerned with the effect of content schemata, Johnston & Pearson (1982) dealt with a more formal aspect of cultural familiarity. They presented their American subjects either a text dealing with a battle during the Civil War, or its modified version. In the modified version, names and places from the original text were systematically replaced by names from an unfamiliar setting (e.g. Frederick => Glod; Maryland => Tan, Civil War => Sacred War, and the like) in order to give them the impression that the story was about some third world country. The results revealed that those who read the modified version showed dramatically lower scores on the following comprehension test. What is remarkable about these findings is that, on the surface at least, only a few names were changed from one version to the next.

However, we have to point out that in Johnston & Pearson work, two important factors were confounded: content knowledge (schemata) about the Civil War and overall familiarity with the setting. Subjects who were assigned to the original text (i.e. the American setting which was familiar to them) were able to activate their knowledge about the Civil War, whereas those assigned to the modified version could not use such content knowledge, simply because there were no clues to invite them to relate their Civil War schemata to the particular battle. We suspect that subjects who read the original version scored better because they took advantage of what they already knew about the Civil War. If the effect of settings is solely attributable to the accessibility to the knowledge about the text, the finding does not provide much new information. In order to prove that (un)familiarity of the setting exerrts its own influences upon the comprehension of a text, these two factors must be sorted out.

In order to evaluate Johnston and Pearson's (1982) results, we conducted an experiment of the same nature with a more complete design: subjects were drawn from two different cultural backgrounds, and they were required to read texts from the two cultures in addition to one from a third, presumably neutral, culture. Each of the three texts was systematically modified to create three versions, one for each of the three cultural settings.

Additionally, we attempted to explore the possible mechanism underlying the effect of setting. We suspected that the effect is primarily attributable to affective factors: a story with an unfamiliar setting and culturally unsympathetic characters may not interest readers, and thus they reduce the energy that they might otherwise put into its comprehension.

Our hypothesis stems from our expectation that cultural effects are often conveyed subtly through aspects of the setting provided by a text, including the inferences that readers draw about the characters. Other things being equal, we expect readers to respond to a text as a function of their ability to identify with the culture, setting, and major characters of a narrative. In other words, when a setting is familiar to readers, the text will be most readable, and it will yield the shortest reading time to read, the best comprehension, and the greatest identification with the text.

METHOD

Subjects

Subjects consisted of two groups of full-time students enrolled in a large Midwestern university: a native English-speaking group (Eng) consisting of 18 undergraduate students, and a native Japanese group (Jpn) consisting of 18 undergraduate/graduate students. The English proficiencies of the Jpn. subjects were estimated to be advanced, since they had been successfully undergoing their higher education training in the US following their admission to the university, which required the minimal score of 550 or higher on the TOEFL.

Material

The three passages were taken from the histories/folklore of Japan, American, and Afghanistan [neutral] respectively. They were minimally revised so that the expressions could be up-dated and the excerpts could stand as

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The analysis of total comprehension score (summed across various question types) revealed main effects for the major variables of First Language, Plot, and Setting, as well as an interaction between First Language and Setting (see Table 3 for means, standard deviations, and ANOVA results). In general, native Japanese-speaking students (M=11.7) performed better than native English-speaking students (M=10.5). The Afghan folk tale (M=12.8) proved significantly easier to understand than either the Japanese historical account (10.6) or the American Civil War account (9.89); the two historical accounts did not differ significantly from one another. With respect to setting, as indexed by the names of the characters, the English culture setting (M=12.3) proved significantly easier than the Japanese culture setting (M=11.0), which itself was easier than the Neutral setting (M=9.91). The interaction of Setting and First Language indicates that native English-speaking students experienced a much larger decrement in comprehension when they moved from a culturally familiar setting to either an unfamiliar or neutral setting than was true for native Japanese-speaking students. The native Japanese-speaking students, in fact, performed as well with American names as with Japanese names; only the Neutral names produced a decrease in their comprehension.

Insert Table 3 about Here

Another way to examine these comprehension results is to look at the scores of the two groups of students across levels of setting and plot. Japanese students responded nearly as well to the American setting as they did to the Japanese setting regardless of the plot they encountered. American students, by contrast, experienced nearly as much of a decrement to comprehension in the Japanese setting as they did in the Neutral setting. In short, American students exhibited less cultural flexibility.

Preferences of Stories

The analysis for story preference indicated main effects for Plot and Setting and no interaction effects, although there is a tendency toward a Setting by First Language interaction. For all subjects, the Afghan plot was the clear favorite. Also across all subjects, the American/English setting evoked consistently higher preferences than the Japanese setting, which was significantly preferred to the neutral setting. As mentioned, there was a tendency toward a Setting by First Language interaction: For both the Japanese and American plot narratives native English-speaking subjects preferred the passages with American/British settings over others. However, for the Afghan plot, they preferred the Japanese setting. Not unlike the English-speaking subjects, the the native Japanese-speaking subjects also indicated the highest preference scores on passages with their native (i.e. Japanese) cultural settings, except in the case of the Afghan plot, where neutral setting induced the highest scores.

Insert Table 4 about Here

DISCUSSION

In terms of comprehension, cultural setting affected American students to a much greater degree than it did Japanese students. Native Japanese speakers, in comparison to native English speakers, were less affected by shifts in either the cultural basis of the narratives they read or the surface clues (i.e., names) as to cultural setting. Surely, a large part of this effect is attributable to the fact that the Japanese speakers in this study are all studying in an American university setting in which cultural adaptation is the norm. Surely, also, whatever adaptive tendencies they have developed in such a setting can be extended to other situations, such as when they are required to read texts that are written in settings that are equally unfamiliar to both Japanese and American students. One other significant comprehension finding: the neutral setting, with the phonologically simple names clearly affected comprehension. Even imposing phonologically difficult Japanese names (for American students) or English names (for Japanese students) was preferable to simple (and clearly unmemorable) names like Da, Ze, and Wa.

In terms of preference, a somewhat different picture emerges. The Afghan tale was a clear winner in comparison to the more content-laden, didactic historical narratives in the Japanese and the Civil War accounts. Clearly, also, no one seems to like the versions with the phonologically simple names; recall that these were also the least well compehended versions for both Japanese and Amercian students.

Overall, the results of the analyses reported in this paper support, with minor modification, the primacy of cultural effects on comprehension. The minor modification seems to be that when students spend considerable time in another culture, they seem to develop greater flexibility in adapting to cultural variation.

Table 1.
Latin Square Design of Experiment
blocks: A, B, C

	PLOTS		
SETTINGS	Japanese	United States	Afghanistan
Japan	A	C	B
English	B	A	C
Neutral	C	B	A

Table 2-1
Scores on the Cultural Knowledge Tests:
full score: 5 points

Cultural Domain		Japanese	American	Afghan
Japanese	Mean	3.50	2.72	3.17
	SD	*1.04*	*1.23*	*1.15*
American	Mean	1.72	3.17	2.11
	SD	*0.57*	*1.99*	*0.76*
Total	Mean	2.61	3.17	2.64
	SD	*1.23*	*1.17*	*1.10*

Table 2-2
ANOVA Table of Background Knowledge Test Score

Sources	df	SS	MS	F-value	P<
L1	1	17.12	17.12	26.10	0.0001
Plot	2	2.46	1.23	1.88	N.S.
L1*Plot	2	23.13	11.56	17.63	0.0001
ID	35	58.55		2.55	0.0005
Error	67	43.95	0.656		
Total	107				

Table 3-1
Comprehension Test Score
full score: 15 points

		Japanese Subjects				English Subjects				All Subjects			
PLOT=> Setting		Jpn	Eng	Afgh	Tot	Jpn	Eng	Afgh	Tot	Jpn	Eng	Afgh	Tot
Jpn	Mean	12.3	11.0	13.5	12.3	8.5	8.5	12.0	9.7	10.4	9.8	12.8	11.0
	SD	*0.67*	*1.24*	*0.67*	*2.32*	*1.28*	*1.78*	*0.58*	*3.40*	*3.00*	*3.82*	*1.66*	*3.16*
US/ UK	Mean	11.8	11.8	13.2	12.3	11.5	12.0	13.5	12.3	11.7	11.9	13.3	12.3
	SD	*0.70*	*0.87*	*0.79*	*1.93*	*0.92*	*0.58*	*0.43*	*1.78*	*1.92*	*1.73*	*1.50*	*1.83*
Neut	Mean	9.3	9.5	12.5	10.4	9.83	6.50	11.8	9.39	9.58	8.00	12.2	9.91
	SD	*1.02*	*1.34*	*0.56*	*2.79*	*1.40*	*1.06*	*0.48*	*3.31*	*2.87*	*3.22*	*1.27*	*3.06*
Tot	Mean	11.2	10.8	13.1	11.7	9.94	9.00	12.4	10.5	10.6	9.89	12.8	11.0
	SD	*2.31*	*2.86*	*1.63*	*2.49*	*3.00*	*3.69*	*1.38*	*3.17*	*2.71*	*3.38*	*1.52*	*2.90*

Table 3-2
ANOVA Table of the Total Comprehension Test Score
Latin Square Design

Sources	df	SS	MS	F-value	P <
L1	1	39.12	39.12	11.74	0.0011
Plot	2	161.4	80.7	24.2	0.0001
Setting	2	103.2	51.6	15.48	0.0001
L1*Plot	2	6.13	3.06	0.92	0.40
L1*Setting	2	32.3	16.15	4.85	0.0001
ID	35	346.5		2.97	
Error	63	209.91	3.31		
Total	107	898.54			

Table 4-1
Preference of Stories
possible highest score: 7 points

		Japanese Subjects				English Subjects				All Subjects			
Setting	Plot	Jpn	Eng	Afgh	Tot	Jpn	Eng	Afgh	Tot	Jpn	Eng	Afgh	Tot
Jpn	Mean	3.67	3.83	3.83	3.78	3.33	2.50	5.17	3.67	3.50	3.17	4.50	3.72
	SD	*1.03*	*1.47*	*1.60*	*1.31*	*0.95*	*0.67*	*0.48*	*2.03*	*1.73*	*1.64*	*1.51*	*1.68*
US/ UK	Mean	3.00	3.33	4.17	3.50	4.33	5.50	4.17	4.67	3.67	4.42	4.17	4.08
	SD	*1.10*	*1.63*	*0.41*	*1.20*	*0.33*	*0.67*	*0.60*	*1.41*	*1.15*	*1.93*	*1.03*	*1.42*
Neut	Mean	2.83	1.67	4.67	2.89	2.50	2.67	4.17	3.11	2.67	1.92	4.42	3.00
	SD	*1.47*	*0.41*	*2.07*	*2.03*	*0.72*	*0.76*	*0.48*	*1.71*	*1.56*	*1.51*	*1.62*	*1.85*
Tot	Mean	3.17	2.78	4.22	3.39	3.39	3.56	4.50	3.81	3.28	3.17	4.36	3.60
	SD	*1.20*	*1.70*	*1.48*	*1.57*	*1.82*	*2.15*	*1.29*	*1.82*	*1.52*	*1.94*	*1.38*	*1.71*

Table 4-2
ANOVA Table of Preference of Stories
Latin Square Design
highest score: 7 points

Sources	df	SS	MS	F-value	P<
L1	1	4.90	4.90	2.90	0.10
Plot	2	31.35	15.675	9.29	0.0005
Setting	2	21.91	10.96	6.49	0.005
L1*Plot	2	1.69	.98	0.50	N.S.
L1*Setting	2	7.91	3.96	2.34	N.S.
ID	35	137.88	3.93	2.34	0.005
Error	63	106.25	1.69		
Total	107	311.88			

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Neutral Setting of American Text, with Items

ell into the Tribe War, and many battles had been fought between East and West. But no battle
ore puzzling than the Battle of Yo Creek. General Wa was the commander of the Zo Army of
g General Ki's Ga Army in Pi. On September 13th, an odd thing happened. Wa's army was
ne of his soldiers, Na, found three potatoes wrapped in a piece of paper lying in a field. The
be an order signed by General Ki. The orders instructed Ki's generals to split their army into
s almost never split up their army in the face of the enemy because each part is small and
he order must have seemed unusual to Wa. Wa was by nature a suspicious man. As a result
ght that Ki was trying to trick him by planting a fake order where Zo soldiers would find it. If
ctions over the next few days, he certainly behaved as if he thought Ki was trying to trick him.
n September 16th, Wa tracked down Ki's army at the town of De near Yo Creek. By that time
four units had rejoined him, so he was nearly ready for battle. Even so, Ki's forces were still
d. But still Wa did not attack. He waited one more day on the excuse that there were so few
hat he thought Ki had already retreated. Thus it was not until the morning of September 17th
's Ga troops in a large wheatfield. By this time, of course, the Ga Army had set up many
h they killed thousands of Wa's men. Halfway through the morning, the battle had reached
the middle of the field. This road later became known as Bloody Lane because so many
d there. Meanwhile, another battle was beginning on the banks of the Yo Creek. This creek had
rched bridge for all the soldiers to get across. On the other hand, it was only about 50 feet wide
ep. General Su was on one side of the creek with 10,000 Zo soldiers. On a hill on the other side
mere 500 Ga soldiers who were shooting down at Su's helpless men. Su was supposed to
he morning and take the hill. He would then have been able to go to the aid of General Wa's
would probably have ended the battle and the Tribe War as well. Instead, Su wasted hours
s troops could get across the small bridge. He did not realize that they could have easily waded
the time he managed to get enough men across the bridge to drive the Ga soldiers from the
urth group had arrived and he had set up a strong battle line. So, by the end of the day, while
ad changed hands, 25,000 soldiers were dead. It was one of the bloodiest days of fighting in
ext day, there was no fighting because both armies were exhausted. However, Wa still had
in reserve who had not yet fought. Why did he not use them against Ki's battered army?
still suspicious. Consequently, the Ga army was able to slip away during the night and the
three more bloody years.

uspicious? (circle one of the four items)

ecret order was fake because
r was wrapped around three cigars and lying in a field.
ngest way to fight is to have all of your army together.
t order had not been signed by General Ki.
ght he was outnumbered by General Ki's army.

a commander in the army of

st.

lorth and South. But
e B. McClellan was the
nfederate Army in
k, Maryland when one
in a field. The paper
their army into four
small and weak by
icious man. As a
Union soldiers would
thought Lee was
at the town of
m, so he was nearly
t attack. He waited
d already retreated.
a large cornfield. By
ands of McClellan's
f the field. This road
another battle was
ge for all the soldiers
Ambrose Burnside
were a mere 500
posed to cross the
eral McClellan's
Burnside wasted
y could have easily
the Confederates
o, by the end of the
bloodiest days of
xhausted. However,
e them against Lee's
ble to slip away

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TEXT TRANSFORMATIONS

<Japanese plot: Death of Yoshitsune>

English	<---- Original (Japanese) ---->	Neutral
	PROPER NAMES	
England	Japan	Bu
Manchester	Yamato	De
Birmingham	Kyoto	Pi
MacFarland family	Heike clan	Zo clan
Dalton family	Genji clan	Ga clan
Kenneth	Yoshitomo	Mi
Fred	Yoshitsune	Wa
Brian	Yoritomo	Ki
Patrick	Kajiwara Kagetoki	Te
Lawrence	Sato	Su
Judy	Shidzuka	Na
Warren	Benkei	Hu
Gregory	Fujiwara Hidehira	Yo
Theodore	Yasuhira	Re
	SETTINGS	
pilgrims	mountain priests	pilgrims
pot	lacquered box	pot
church	temple	shrine

<English Text: The Battle of Antietam Creek>

Japanese	<------ Original (English) ---->	Neutral
	PROPER NAMES	
Japan	America	Hu
Uji River	Antietam Creek	Yo Creek
Fushimi	Frederick	Re
Yamashiro	Maryland	Pi
Echizen	the Potomac	Bu
Yahata	Sharpsburg	De
Hokucho	Confederate	Ga
Nancho	Union	Zo
Takahara Kagemitsu	George B. McClellan	Wa
Hirabayashi Toshitaka	[Robert E.] Lee	Ki
Inoda Kenmotsu	Private Barton Mitchell	Na
Kurikoma Moroyuki	Ambrose Burnside	Su

<English Text: **The Battle of Antietam Creek**, cont.>

SETTINGS

Nanbokucho War	Civil War	Tribe War
ricefield	cornfield	wheatfield
Nancho	South	East
Hokucho	North	West
rice cakes	cigars	potatoes
bows and arrows	cannons	cannons
be ready to shoot	set up	set up

<Afghan (Neutral) Text: >

Japanese	**<----- Original (Neutral) —>**	English

PROPER NAMES

Kanazawa	Hu	Kansas
Toyama	Mi	St. Louis
Owari	Yo	Oregon
Hida	Re	Rocky
Kamigata	Ga	California
Osaka	Zo	San Francisco
Anzaemon	Wa	Fred
Oritsu	Ki	Martha
Yanosuke	Te	Steve
Shinkichi	Su	George
Hidematsu	Na	Thomas

SETTINGS

fresh fish	dry fruits	dry fruits
rope	rope	lariat
mat	prayer mat	prayer mat
whip	stick	whip
magic pot	magic pot	Marylin's magic pot

EXCERPTS FROM THE READING MATERIALS

Plot: American, Setting: Japanese

Japan was well into the Nanbokucho War, and many battles had been fought between the Hokucho and the Nancho. But no battle was bloodier nor more puzzling than the Battle of the Uji River. General Takahara Kagemitsu was the commander of the Hokucho Army of Echizen. He was chasing General Hirabayashi Toshitaka's Nancho Army in Yamashiro.

Plot: American, Setting: American

America was well into the Civil War, and many battles had been fought between North and South. But no battle was bloodier nor more puzzling than the Battle of Antietam Creek. General George B. McClellan was the commander of the Union Army of the Potomac. He was chasing General Robert E. Lee's Confederate Army in Maryland.

Plot: American, Setting: Neutral

Hu was well into the Tribe War, and many battles had been fought between East and West. But no battle was bloodier nor more puzzling than the Battle of Yo Creek. General Wa was the commander of the Zo Army of Bu. He was chasing General Ki's Ga Army in Pi.

Plot: Neutral (Afghan), Setting: Japanese

A rich and renowned merchant, Anzaemon, of Kanazawa had a beautiful daughter, Oritsu of marriageable age. The fame of her beauty and graces had spread far and wide, and Anzaemon received many offers of marriage from sons of rich folks. One such proposal came from Yanosuke, a big merchant of Toyama, a nearby town, offering his son Shinkichi, an eligible suitor.

Plot: Neutral (Afghan), Setting: English

A rich and renowned merchant, Fred, of Kansas had a daughter, Martha of marriageable age. The fame of her beauty and graces had spread far and wide, and Fred received many offers of marriage from sons of rich folks. One such proposal came from Steve, a big merchant of St. Louis, a nearby town, offering his son George, an eligible suitor.

Plot: Neutral (Afghan), Setting: Neutral

A rich and renowned merchant, Wa, of Hu had a beautiful daughter, Ki of marriageable age. The fame of her beauty and graces had spread far and wide, and Wa received many offers of marriage from sons of rich folks. One such proposal came from Te, a big merchant of Mi, a nearby town, offering his son Su, an eligible suitor.

Plot: Japanese, Setting: Japanese

By virtue of his ingenious strategies and bravery, Yoshitsune, as the commander of the Genji troops, revenged his father Yoshitomo's death by defeating the Heike clan. The Genji's victory achieved by Yoshitsune enabled his elder brother and the chief of the Genji, Yoritomo, to be promoted to the ruler of a large portion of Japan.

Plot: Japanese, Setting: English

By virtue of his ingenious strategies and bravery, Fred, as the commander of the Dalton troops, revenged his father Kenneth's death by defeating the McFarland family. The Dalton's victory achieved by Fred enabled his elder brother and the chief of the Dalton, Brian, to be promoted to the ruler of a large portion of England.

Plot: Japanese, Setting: Neutral

By virtue of his ingenious strategies and bravery, Wa, as the commander of the Ga troops, revenged his father Mi's death by defeating the Zo clan. The Ga's victory achieved by Wa enabled his elder brother and the chief of the Ga, Ki, to be promoted to the ruler of a large portion of Bu.

independent passages. To create the neutral setting version of each of these three plots, every proper name in the Afghan, Japanese and American passage was systematically replaced by a consonant followed by a vowel (e.g., America => Fu, Yahata => De), so that the readers could not associate the passage with any particular culture. To create the culturally relevant versions of each text, a set of Japanese names or English names were substituted for the neutral names. Additionally, some expressions were modified (e.g. corn [original] ---> rice [Japanese]; wheat [neutral]) so that they fit the geographical setting suggested by the proper names chosen. These modifications effectively transported the whole settings to Japan in the Middle Age or an unknown third world country.

This process resulted in an interesting pattern across settings: a story assumes the lowest readability grade when it is assigned to a neutral setting (because of the simple phonological structures of proper names), and the highest readability grade when assigned to a Japanese setting (because of the length of many of the names). If readability accurately predicts the comprehensibility of a text, readers should find the neutral setting texts the easiest and the Japanese texts the most difficult.

Fifteen multiple-choice comprehension questions concerning the content of the text were attached at the end of the text. The fifteen questions consisted of five textural explicit questions, five textural implicit questions, and five scriptually implicit questions (Pearson & Johnston, 1978). Following these comprehension questions, inquiries about readers' interest in the passage were asked. Additionally, fifteen multiple questions each assessing the cultural/historical knowledge about the Civil War, the Japanese history in the Middle Age, and the Afghan society were developed.

Procedure

In advance of the experiment, the subjects were instructed to read the passages as quickly as possible, and then answer the following questions without looking back at the passage. They were allowed to read each passage only once, without consulting a dictionary or taking a note (these instructions were also printed at the beginning of the experiment packet mentioned below).

As to the assignment of passages to subjects, a Latin Square Design was employed: each English group and Japanese group was divided into three subgroups consisting of 6 subjects respectively. Each six subjects were assigned to one of the three blocks (A, B, or C) indicated in the Table 1, so that every subject was exposed to three passages with different plots and different cultural settings.

Insert Table 1 about here

The six subjects within a block read the three passages each in one of the six ($3! = 3 \times 2 \times 1 = 6$) possible orders. The subjects were asked to record the lengths of time spent to read each passage, as well as those to answer questions. The data were subjected to a repeated measurements analysis of variance appropriate for the latin-square design that was used to assign subjects to treatment conditions. The analysis allowed us to unambiguously determine the main effects for First Language, Plot, and Setting as well as the two way interactions of First Language with Plot and Setting, respectively.

RESULTS

Amount of Background Knowledge

For the set of background knowledge items administered after the comprehension tests had been completed, there was a main effect for First Language, but not for Plot; however, First Language and Plot interacted in a predictable fashion. Specifically, the native English subjects, the majority of whom were American citizens, scored significantly higher on the questions regarding the US Civil War than on either the Afghan society or the Japanese Middle Age history questions. Conversely, the Japanese subjects achieved their highest score on the questions regarding Japanese history, with a small drop off on the Afghan society plot and a precipitous drop for the Civil Was scenario (see Table 2). The interaction of first language and plot was significant

Insert Table 2 about Here

Comprehension Test Scores